CLAIMS

What is claimed is:

1. A method of detecting nuclear quadrupole resonance in an object, comprising:

d) providing two or more sensors tuned to a specified nuclear quadrupole resonance frequency, wherein each sensor receives the specified nuclear quadrupole resonance signal;

e) applying a radio frequency magnetic field to the object; and

f) adding coherently the signals detected by the sensors.

2. The method of claim 1, wherein each sensor is comprised of a high temperature superconductor self-resonant planar coil, and wherein each sensor solely detects the specified nuclear quadrupole resonance signal.

3. The method of claim 1, wherein each sensor is comprised of two or more coupled high temperature superconductor self-resonant planar coils, and wherein each sensor solely to detects the specified nuclear quadrupole resonance signal.

4. The method of claim 1, wherein the radio frequency magnetic field is applied to the object with a copper shielded-loop resonator coil.

5. The method of claims 2 and 3, wherein each high temperature superconductor self-resonant planar coil is a $YBa_2Cu_3O_7$ or $Tl_2Ba_2CaCu_2O_8$ self-resonant planar coil.

6. The method of claim 1, wherein the electrical path from each sensor to the combination point is adjusted so that the signals add constructively at the combination point.

7. The method of claim 1, wherein each sensor is essentially equidistant from the object, and the electrical path from each sensor to the combination point is essentially identical.

8. The method of claim 1, wherein each signal, before combination, is multiplied by a constant complex factor specific to the electrical path from each sensor to the combination point to correct for any phase differences between the signal paths and provide constructive addition of the signals at the combination point.

9. The method of claim 1, wherein the object comprises explosives, drugs or other contraband.

10. A nuclear quadrupole resonance detection system for detecting nuclear quadrupole resonance in an object, comprising:

c) two or more sensors tuned to a specified nuclear quadrupole resonance frequency, wherein each sensor receives the specified nuclear quadrupole resonance signal; and

d) means to add coherently nuclear quadrupole resonance signals detected by the sensors.

11. The detection system of claim 10, wherein each sensor is comprised of a high temperature superconductor self-resonant planar coil, and wherein each sensor solely detects nuclear quadrupole resonance signals.

wherein the signals received across the paths add constructively at the combination point.

18. The detection system of claim 17, wherein each sensor is comprised of a high temperature superconductor self-resonant planar coil, and wherein each sensor solely detects nuclear quadrupole resonance signals.

19. The detection system of claim 17, wherein each sensor is comprised of two or more coupled high temperature superconductor self-resonant planar coils, and wherein each sensor solely detects nuclear quadrupole resonance signals.

20. The detection system of claims 18 and 19, wherein each high temperature superconductor self-resonant planar coil is a $YBa_2Cu_3O_7$ or $Tl_2Ba_2CaCu_2O_8$ self-resonant planar coil.

21. The detection system of claim 17, further comprising a copper shielded-loop resonator coil to apply a radio frequency signal to the object.

22. The detection system of claim 17, wherein each sensor is essentially equidistant from the object, and wherein the electrical path from each sensor to the combination point is essentially identical.

23. The detection system of claim 17, wherein the object comprises explosives, drugs or other contraband.